

**FINAL EXAM INFORMATION – MATH 2200
SPRING 2018**

TO BE HELD ON WEDNESDAY, MAY 2ND, 2017 AT 8:00AM

The final will cover the material we have covered this semester. This includes large parts of chapters 1-5, as well as parts of 6 and 9. There will be 6 pages on the exam plus one extra credit page.

- (1) The first page will be short answer questions. Everything from logic (negating some statement), to relations, to functions, to counting is fair game.
- (2) The second page will also be short answer questions.
- (3) I will ask you to do one of the following things. Suppose $f : A \rightarrow B$ and $g : B \rightarrow C$ are functions.
 - (a) Prove that if f and g are injective, so is $g \circ f$.
 - (b) Prove that if f and g are surjective, so is $g \circ f$.
 - (c) Prove that if $g \circ f$ is injective, so is f .
 - (d) Prove that if $g \circ f$ is surjective, so is g .
 - (e) Give an example such that $g \circ f$ is injective but g is not.
 - (f) Give an example such that $g \circ f$ is surjective but f is not.
- (4) There will be a proof problem related to induction / strong induction / well ordering.
- (5) There will be a problem related to number theory / modular arithmetic (ie, the Chinese Remainder Theorem, Fermat's little theorem, etc.)
- (6) There will be a random (surprise!) proof problem. It could be about sets, or relations, or functions, or some combination of those things.
- (EC) There will be two parts to this problem. One part will be computational involving cryptography. The second part will be more proof based and related to number theory.